

Process and Tool Innovation for CAD Integration with OLTARIS, Phase II

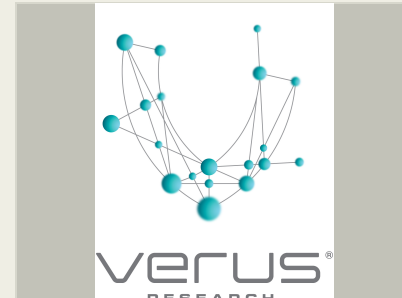
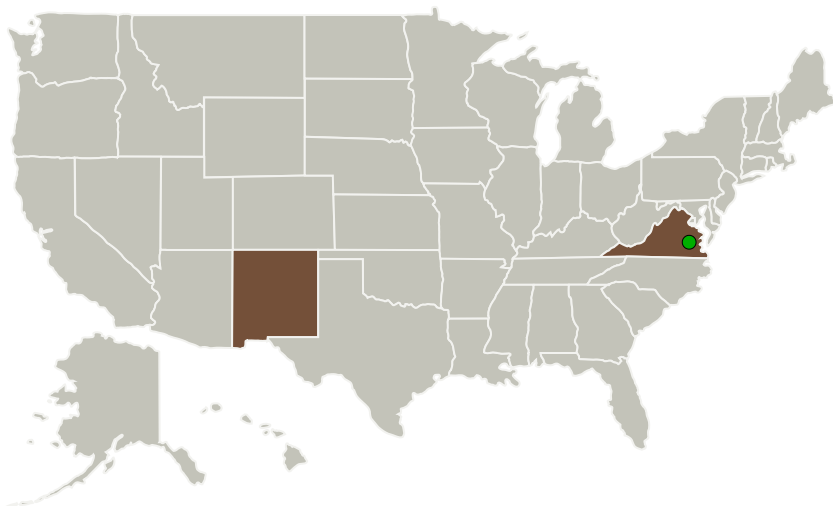
Completed Technology Project (2017 - 2019)



Project Introduction

NASA uses computer aided design (CAD) capabilities to produce space vehicle designs. One aspect of the vehicle design is utilizing enough shielding to minimize dose on personnel. NASA CAD models inherit errors and issues during their inception that prevent them from being used with NASA's radiation transport code, High Z and Energy Transport (HZETRN). XL Scientific developed a ray tracing tool to generate inputs for HZETRN, called the CAD Radiation Integration Tool (CRIT). This tool maintains material density and type, unlike any other existing capability. XL Scientific also developed methods of identifying and correcting common CAD errors. In phase II, XL Scientific will expand both CRIT and the CAD repair tools developed in Phase I. Functions will be added to CRIT to read STEP and DICOM file types. We will add interfaces for both HZETRN2015 as well as industry standard radiation transport code, Monte Carlo N-Particle (MCNP). MCNP is widely used in the nuclear community for radiation transport calculations and adding it to CRIT will expand commercialization options to the nuclear and healthcare industry. We will also automate the CAD repair tools developed in Phase I. Automation will allow users to correct common errors quickly and reduce the overall time spent repairing models. Furthermore, XL Scientific will add a sensitivity analysis option to investigate what effect model simplification has on radiation transport results. At the end of the Phase II effort, XL Scientific will have a tool to diagnose and repair CAD model quickly and provide robust radiation transport calculations. This innovation is anticipated to be of interest to government and commercial entities.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
XL Scientific, LLC	Lead Organization	Industry	Albuquerque, New Mexico
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
New Mexico	Virginia

Project Transitions

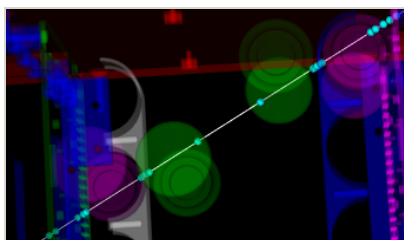
▶ **June 2017:** Project Start

✓ **June 2019:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/141160>)

Images



Briefing Chart Image

Process and Tool Innovation for CAD Integration with OLTARIS, Phase II Briefing Chart Image (<https://techport.nasa.gov/image/134851>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

XL Scientific, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

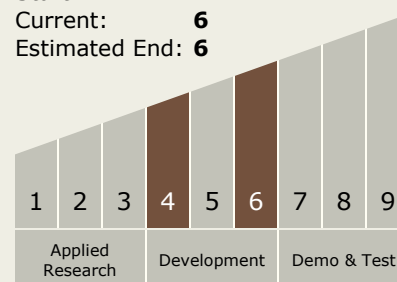
Carlos Torrez

Principal Investigator:

Brian Gorgas

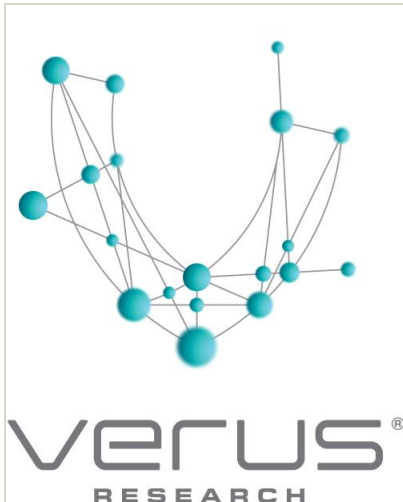
Technology Maturity (TRL)

Start: 4
Current: 6
Estimated End: 6



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Final Summary Chart Image

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(<https://techport.nasa.gov/image/135754>)

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
 - └ TX06.5 Radiation
 - └ TX06.5.4 Space Weather Prediction

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System